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RECOMMENDATIONS FOR STUDENTS WITH COCHLEAR IMPLANTS IN MAINSTREAM EDUCATIONAL PLACEMENTS

To gain access to the curriculum and to develop good peer relationships, deaf children who use cochlear implants in mainstream educational placements need supportive accommodations and services. Many of these modifications are the same as those needed for children with hearing loss who use hearing aids. However, the way the changes are implemented, and what to expect from the changes, may be different for cochlear implant users as compared to hearing aid users.

A cochlear implant is a device that is surgically implanted in the ear to stimulate the auditory nerve in synchrony with incoming sounds. With the use of an externally worn speech processor, a child using a cochlear implant can detect sounds as weak as a person with only a mild hearing loss would be able to detect, although the challenges posed by the child's profound hearing loss are far greater than a mild loss. Many children with cochlear implants learn to understand spoken words through audition alone, but most have language deficits from having a profound hearing loss during the early years in which children learn language most easily. All children with cochlear implants have difficulty hearing clearly in group and noisy situations. Many require the use of additional devices such as FM systems to hear the teacher adequately. Some benefit from the use of a hearing aid in the unimplanted ear, and some use a cochlear implant in each ear.

The educational program for any child must be **individualized.** However, each of the following considerations should be included in a discussion of the child's needs.

"MAPPING" AND EVALUATIONS:

The child's externally worn speech processor should be mapped (reprogrammed) every three to six months, or more often in the early years of implant use, depending on the child's needs and progress as determined by the audiologist at the cochlear implant center. Additional appointments may be needed if changes are noted in the child's speech perception abilities between regularly scheduled "mapping" appointments. Mapping visits typically are covered by medical insurance. Mapping consists of adjusting the electrical stimulation levels delivered to each channel of the internal portion of the implant, so that sounds in different frequency bands stimulate equally comfortable sensations of hearing.

After making a new "map" (program) with a computer, the audiologist checks and adjusts the map based on the child's ability to perceive speech sounds correctly.

An annual, thorough audiological evaluation also should be conducted at the implant center in a sound-treated audiometric test booth. This evaluation should include a test of the child's thresholds for detection of sounds with the speech processor, and also an audiogram for each ear without the processor. The child's ability to recognize words and sentences should be tested in quiet and in background noise conditions with the speech processor. If the child uses a cochlear implant on each ear, or a cochlear implant in one ear and a hearing aid in the other ear, the evaluation should assess auditory performance with each device separately and together. Some children should have the audiological evaluation more often than once a year, particularly if the child is very young or if the hearing in an unimplanted ear may be fluctuating. The audiologist refers the child back to the physician for any problems with the middle ear, the skin over the implant, or the internal device.

The child should have an annual speech and language evaluation by a clinician who has specific expertise and experience assessing young deaf and hard of hearing children. A psychological evaluation should be conducted at least once every three years, including an assessment of cognitive, academic, and social-emotional progress. The psychologist should be one who has expertise working with children who are deaf or hard of hearing, and should be able to communicate in the language and modalities used by the child.

SUPPORT FOR THE TEACHER:

An inservice training session regarding the student's hearing loss, equipment, and appropriate teaching strategies should be conducted at the start of each school year. All school staff members who will have regular contact and interaction with the child should attend. Ongoing support and consultation must be available throughout the school year. The need for this staff training should be written into the child's IEP.

The services of a teacher of the deaf should be provided on a consultative basis to the classroom teacher. If needed, the teacher of the deaf also should provide direct academic support services to the student. The teacher of the deaf may provide individual academic support to the student within the classroom, outside the classroom, or both.

The use of an aide or paraprofessional in the mainstream classroom should be considered for a child with a cochlear implant. This individual makes certain that the child has heard and understood spoken instructions; preteaches and reviews class lessons, songs and poems, with an emphasis on the *language* used in the lessons; and facilitates and maintains communication among the teacher, parent, child, aide, speech-language pathologist, teacher of the deaf, and special class teachers for art, music and gym. The aide often maintains a circulating notebook to assist in this process and to maintain a "script" of the

vocabulary or grammar used in class that seems to be difficult for the student, and to note any equipment problem or other problem that needs to be addressed.

School staff members who play key roles in the child's educational program should be given the opportunity to attend a workshop on educational and habilitative support for children with cochlear implants, when this opportunity is possible.

CLASSROOM COMMUNICATION STRATEGIES:

Class discussions should take place in a circle or horseshoe shape whenever possible, rather than in a cluster of children all facing one another's backs. It should be remembered that a child who uses a cochlear implant can not determine the direction from which a voice is coming. When the teacher calls on another student, the student with the cochlear implant will need to be "clued in" by pointing to or naming the next talker, to afford the opportunity to focus on the new talker. Without this clue, the initial part of what is said will be missed. The teacher should routinely repeat or rephrase any comment or question from another student for the benefit of the entire class, before responding. Only one person should speak at a time. Laughter or another voice overlapping an important comment will cause the child with the cochlear implant to miss that comment.

The teacher should not expect the student with a cochlear implant to understand what the teacher has said while facing the chalkboard nor with a book held in front of the face. The teacher should not stand with his or her face in shadow (that is, not with the back to a sunny window). The student should be seated so that the side with the cochlear implant is closer to the voices he or she needs to hear.

A "buddy" system is suggested on the playground, on class trips, and at school events involving large groups, to make certain that the child is aware of instructions made to the group.

If the school curriculum includes listening to tapes, CDs, or computer software through headphones, the child with a cochlear implant should be provided with the appropriate patch cord for use with this equipment, which should be tried out privately in advance and kept available in the classroom at all times.

Instructional videos should be captioned, even for beginning readers. A free, federally funded, extensive loan bank of captioned videos is available at www.cfv.org. The teacher may need help from the person in the school who is most familiar with audio-visual equipment, to turn on the captions before the first time that teacher will be using a captioned video in class. If the child uses an FM system (see below), the microphone for the child's FM system should be placed at the speaker or sound source of the video recorder/monitor, or an audio cable used to connect the output to the input of the FM transmitter.

A few students with cochlear implants, particularly those who began to acquire auditory-based spoken language at an older age, use an interpreter in class. The interpreter may be a sign language interpreter, an oral transliterator, or a Cued Speech transliterator. If an interpreter is used, then careful planning is needed to clarify when the student should be paying attention to the interpreter versus the teacher. In addition, it must be clarified whether the person to be hired will function strictly as an interpreter, or whether the interpreter should also function as an instructional aide. As the student gains auditory skills, he or she may wish to pay attention to certain teachers whose voices are audible, and may wish to turn to the interpreter only as needed for clarification.

Students in higher grades in which notes are taken may need the help of a notetaker. Some students in higher grades may need text support during class, in the form of CART (Computer Assisted Realtime Translation; see information available at http://www.netac.rit.edu/downloads/TPSHT_CART.pdf), or C-Print) http://www.netac.rit.edu/publication/tipsheet/cprint.html); or other technologies to display the teacher's words and class discussion in text form during class.

SPEECH-LANGUAGE THERAPY:

The child should be provided with individual speech-language therapy in a private, acoustically appropriate room. The number of sessions or hours per week depends on many factors including the child's age, speech and language skills, ability to be productive in long versus short sessions, and recommendations from resulting from the annual speech-language evaluation and the child's cochlear implant center team. The clinician should have experience and expertise in the auditory-based spoken language development of children who use cochlear implants. In some cases, a private clinician may need to provide this service; if so, a plan needs to be established for communication between the clinician and school staff. If the school-based speech-language pathologist has had training but not prior experience with cochlear implants, strong consideration should be given to providing for an outside speech-language pathologist to serve as a consultant to provide mentoring to the school-based clinician. The speech-language pathologist should communicate with the teacher and/or aide on a regular basis regarding vocabulary and grammar which the student finds difficult in class, to be able to focus on those elements. In addition, the speech-language pathologist should help the student to learn conversational strategies to use with peers, such as how to enter and leave a conversation, how to acknowledge what another child has said, and how to request clarification of what has been said.

Most children with cochlear implants should continue to have speech and language therapy during the summer months to prevent significant regression in their skills.

ACOUSTICAL TREATMENT OF THE CLASSROOM:

Deaf or hard of hearing individuals who use cochlear implants and/or hearing aids, even those who hear clearly in quiet rooms, have significant difficulty understanding speech in a

typical classroom setting because of background noise and reverberation. The background noise in the classroom should be no greater than 35dB(A) when the classroom is unoccupied and when the heating/ventilating/air conditioning (HVAC) system is turned on. When the classroom is occupied, the teacher's voice, when measured at the child's seat, needs to be at least 15 decibels above the decibel level of the background noise, in order to be heard and understood. An FM educational amplification system usually is needed to boost the teacher's voice more than 10 decibels over the background noise in a classroom full of children, even with good classroom acoustics. The reverberation (echo) time in the room should be no longer than 0.4 seconds for a student listening with a hearing loss. Consultation from an acoustical engineer often helps to pinpoint the most cost-effective means of making the classroom acoustically accessible.

To improve the acoustics of the classroom to an adequate condition, a number of considerations can be addressed. The chosen classroom should be as far away as possible from noisy places such as the playground, outdoor road traffic, indoor school traffic, cafeteria, gym, and music room. When choosing a classroom, it should be kept in mind that structured rather than open-style or multi-group teaching strategies generate lower background noise levels. HVAC systems should be modified and kept in good repair to reduce noises from blowers and vibration of parts. Classroom doors should be kept closed, and if necessary weather stripping should be applied to reduce hallway noise from entering the classroom. Carpeting will minimize noise generated within the classroom from furniture scraping, objects dropping, and footsteps. It should be kept in mind that odd noises in the classroom from a live animal cage, aquarium, or even a noisy electric wall clock can be distracting to a cochlear implant user. Reverberation (echo) can be reduced by installing high-performance acoustical ceiling tile and acoustical wall panels such as tectum. The wall panels can be "tackable" and can double as bulletin boards. The ceiling tiles and wall panels can be removed and re-installed in a different room each year. Large areas of smooth, hard surfaces can be broken up with fire-retardant fabric wall hangings. Partitions such as bookcases help to break up reverberation.

Helpful web sites on classroom acoustics
include **www.classroomacoustics.com** and **www.nonoise.org/quietnet/qc/**.

EDUCATIONAL AMPLIFICATION:

A cochlear implant user may use one of three types of FM or infrared system: a small wearable FM receiver plugged in to the speech processor; a small portable desktop speaker; or one or more speakers mounted apart from the child's desk to broadcast the teacher's voice to the entire room. In all cases, the teacher must wear a microphone/transmitter. A second microphone/transmitter may be used to pass around to students during group discussions. The purpose of the FM system is to assure that the child with a hearing loss receives the teacher's voice at a loudness level sufficiently above that of the background noise to understand what is said, no matter how far away the teacher moves from the student. The child's cochlear implant audiologist makes a

recommendation for the specific FM system and any adapter to be used. The child also may need FM input to a hearing aid in the unimplanted ear, if the child can recognize words using the hearing aid. The FM system should be used for all subjects throughout the school day and for extracurricular activities that support the goals included in the IEP.

CARE OF THE COCHLEAR IMPLANT SPEECH PROCESSOR:

Spare, fresh batteries and replaceable parts for the speech processor should be kept at school. In the beginning of the school year, the parents and staff should agree upon a comfortable plan for dealing with malfunctions of equipment that may occur. Only a staff member who has been trained to replace batteries and cords should do so. An older student should be able to replace parts alone. The processor should not be dropped and should not be allowed to get wet.

To prevent the possibility of damage to any part of the cochlear implant device or interference with the integrity of the speech processor programs, the school staff must be aware of electrostatic discharge conditions and assist the child in taking precautions. The entire external component must be removed from the child's body for activities which generate electrostatic buildup, such as going down a plastic slide, using a plastic tumbling mat, trampoline, crawl-through maze, going under a nylon parachute, or (in science class) being near a van de Graaf generator. A child with a cochlear implant must not hit the ball with the head in soccer, and should wear a helmet for the same physical activities for which a helmet is recommended for any child.

TEAM COMMUNICATION CONSIDERATIONS:

A specific member of the school staff, usually either the speech-language pathologist or consulting teacher of the deaf, should be identified to communicate with the audiologist at the implant center on a regular basis regarding any problems with equipment or auditory perception. A school staff member and the implant center audiologist should communicate before and after each mapping visit. The parent should be asked to help by reminding the school staff of any upcoming mapping appointment a few days before the visit, so that the school staff member who communicates with the implant center audiologist has an opportunity to solicit input from other school staff and to communicate with the implant center.

Time should be built into the schedule at least once a month for communication among the entire team, including parents, to troubleshoot, fine tune and refocus the educational services and goals.

RELATIONSHIPS WITH PEERS:

The child's social and emotional status must be considered at all times in planning educational supports. The student should be given the opportunity to explain to the class

what a cochlear implant is and what helps him or her to follow discussions. If the student is too young or not yet willing to explain the cochlear implant to the class, then a parent, audiologist, speech-language pathologist, or teacher of the deaf may assist by providing this explanation to the class, early in the year and with the child's assent. Opportunities for the student to interact with other students in mainstream placements are appreciated by the child and help to build and maintain good self esteem. Seating the child near a helpful friend in class or in the cafeteria helps to give the child confidence.

Because peer relationships often grow stronger during recess, sports, and other extracurricular activities, consideration should be given to making certain that the child has access to what is being said in these situations. Prior knowledge of the "rules" of a sport or other extracurricular activity, before the first session, helps the child to feel confident that he or she will be able to do the activity, and gives the child more confidence to interact with peers in these situations.

LOOKING FORWARD TO SUCCESS:

The information in this document should help the school team move to the starting line with confidence in planning individualized educational services for a child with a cochlear implant.

The experience of providing a mainstream educational placement for a child with a cochlear implant can and should be an extremely rewarding one for the school staff. The child's progress serves to reward the school staff for the teamwork that is needed to generate creative solutions to occasional communication obstacles, and the courteous listening environment that is helpful for the child with the cochlear implant benefits the entire class.

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